

Mine Environment Neutral Drainage (MEND) Initiative



CANADA'S NATURAL RESOURCES

NOW AND FOR THE FUTURE

Gilles Tremblay and Charlene Hogan
MEND Secretariat

11th Annual BC/MEND Workshop
December 2004



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Ressources naturelles
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Presentation Highlights

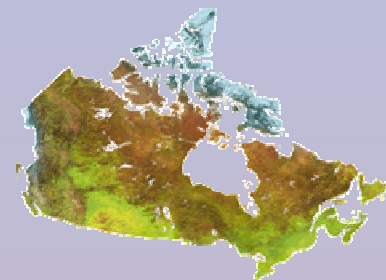
- Budget
- MEND Projects
- Technology Transfer
- Program Plans for 2005



MEND Budget

Budget of \$275K for 2004/2005.

- \$175K for research projects
 - \$125K from MAC
 - \$50K from CANMET in kind
- \$100K for Secretariat (MAC \$50K; CANMET \$50K in kind)



MEND Projects - Completed

- Neutral Leaching (MEND 10.1)
 - Review of Water Quality Issues in Neutral pH Drainage: Examples and Emerging Priorities for the Mining Industry in Canada. (R. Nicholson, Stantec)
- Covers for Permafrost (MEND 1.61.4)
 - Case study review on existing and proposed tailings cover concepts in permafrost. Case histories for Nanisivik, Raglan, Lupin and Rankin Inlet are presented. (I. Holubec)



MEND Projects - Completed

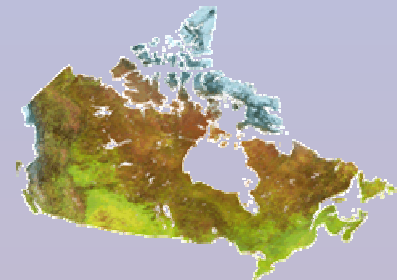
- Case Studies in BC:
 - Case studies that illustrate site specific application of metal leaching/acidic drainage migration and assessment. (Bill Price, NRCan)
 - Sites under review:
 1. Johnny Mountain Mine – completed (MEND 9.1a).
 2. Sulphurets Mine – in review.
 3. Snip Mine – in final review.
- Checklist
 - List of potential information requirements and factors to consider in ML/ARD assessment and mitigation work. Produced as MEND 5.10 E. (Bill Price, NRCan)



MEND Projects - Completed

Dry Covers Manual – MEND 2.21.4

- Incorporates and integrates the best available technology for the design and construction of cover systems over mine wastes (O’Kane Consultants)
- Five-volume set available in hard copy or CD-ROM:
 - Volume 1: Summary
 - Volume 2: Theory and Background
 - Volume 3: Site Characterization, Conceptual Cover Design, Approach to Numerical Modelling
 - Volume 4: Field Performance Monitoring, Sustainable Performance of Cover Systems
 - Volume 5: Case Studies



Dry Covers Manual



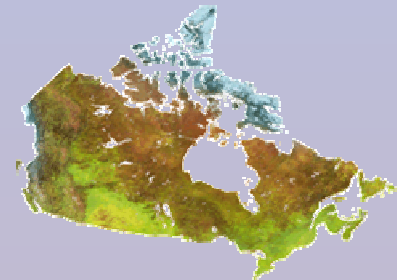
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Ongoing MEND Projects

- Disposal Options for Lime Sludges
 - State-of-the-art review and assessment of available disposal options. In final review. (J. Zinck, NRCan)
- Underground Paste Backfill
 - Compilation of available information on paste backfill and its use in prediction of long-term effects. Comments recently provided on Draft. (P. Mehling, Mehling Environmental Management)



Ongoing MEND Projects

- Case Study Assessment (SNC-Lavalin Environment)
 - To assess and verify the effectiveness of AD pollution prevention and control techniques.
 - Phase I: Case studies were prepared for:
 - Dona Lake, Placer Dome
 - Heath Steele, Noranda-Falconbridge
 - Mandy Lake, HBMS
 - East Sullivan, Province of Québec
 - Lorraine, Province of Québec
 - Phase II: Field investigations completed at Heath Steele



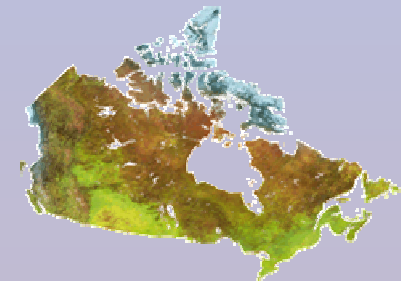
MEND Projects in 2004

- Dry Cover Manual (O’Kane Consultants)
 - A review of the long-term performance of cover system at the macro-scale (i.e. watershed)
- Prediction Manual (B. Price, NRCan)
 - *Draft Guidelines and Recommended Methods for the Prediction of ML and ARD in BC (1978)* to be updated and published as a national State-of-the-Art Prediction Manual.
 - Consultants: Stephen Day, Kevin Morin and Nora Hutt to provide assistance
 - Co-funded by INAP, BC, MERG (Yukon) and Ontario



MEND Projects in 2004

- Diavik Diamond Mines Waste Rock Management Project (consortium)
 - Collaborative project with INAP/Global Alliance
 - MEND agreed to fund at \$20K/year for 5 years
- Review of Molybdenum and Selenium Issues (R. Nicholson, EcoMetrix)
 - Follow-on work from the neutral drainage review



Technology Transfer

- The MEND Monitor
 - January 2004
 - September 2004
- Presentations
 - Mine Water 2004 (UK)
- Ontario/MEND + BC/MEND Workshops
- Global Alliance
- MEND Website at: mend.nrcan.gc.ca
- Environment and Mine Wastes Management – Industrial NSERC Chair
- NOAMI – MEND Link



October 2003

The MEND Monitor

Sixth International Conference on Acid Rock Drainage (ICARD)

The 6th ICARD was held in Cairns, Australia from July 14 - 17, 2003. With its theme of "Application and Sustainability of Technologies" the conference continued the tradition of previous ICARDs in providing an outlook of cutting edge research and innovative technologies relevant to acidic drainage.

The conference proceedings provide a timely review of the innovative approaches that have been developed for the prediction, prevention, treatment and monitoring of acidic drainage. Proceedings, available only on CD-ROM, can be obtained from AusIMM. Consult their web site at www.ausimm.com.

The Global Alliance for acidic drainage research between INAP and Regional Organizations was announced at ICARD. Representatives from the partnership groups attended the conference and presented at the plenary session. Partners include, from left to right, Charles Baskin (ADTI), Ross Gallinger (INAP, Chair Operating Committee), Clive Ball (ACMER), Robin Ballham (INAP, Chair Board) and Giles Tremblay (MEND).

Developing an Operation, Maintenance and Surveillance Manual for Tailings and Water Management Facilities: Published by The Mining Association of Canada (MAC). Copies can be obtained through the MAC web site at www.mining.ca.

Further MEND Projects for 2003

Assessment of Disposal Options for Lime Sludge: State-of-the-art review and assessment of available disposal options for lime sludge. Options to be evaluated for feasibility, environmental impact and relative costs. Contractor: *Natural Resources Canada*.

Neutral Leaching: A review of mining operations in Canada to scope out the priority metals and chemicals of concern, potential challenges and cost implications associated with metal leaching under non-acidic conditions. Contractor: *Stantec Consulting Ltd (Brampton)*.

Case Study Assessments: An Environment Canada sponsored study to assess and verify the effectiveness of acidic drainage pollution prevention and control techniques. Phase I consists of assessing information for five Canadian mine sites; Phase II will consist upon field investigations at two of these sites. Contractor: *SAC-LAVALIN Environment Inc.*

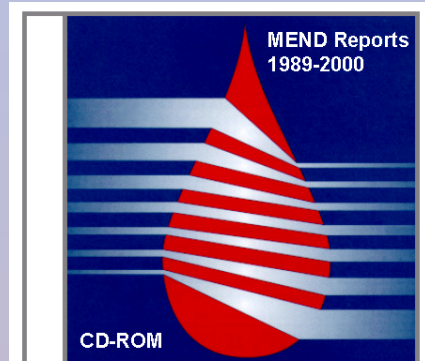
MEND3 Steering Committee Members

Mike Aice – Placer Dome Canada Ltd.
Kim Belfontaine – BC Ministry of Energy and Mines
Louis Bellenue – Ministère des Ressources naturelles, de la Faune et des Parcs du Québec
Catherine Coumans – MiningWatch Canada
WFP Dick Cowan – Ontario Ministry of Northern Development and Mines
Amy Cook – Environmental Mining Council of BC
Patrick Fedy – Environment Canada
Ross Gallinger – BHPBilliton Base Metals
Elizabeth Gardner – The Mining Association of Canada
Drew Kemp – Noranda Inc. – Falconbridge Ltd.
John Mathuck – Barrick Gold Corporation
William Bill Price – Natural Resources Canada (NRCan)
Chastene Hogan (Secretary) – NRCan
Giles Tremblay (Secretary) – NRCan

Please contact any of the above members for further information on MEND.

To obtain information on MEND, or its publications please visit our web site at the following URLs:
mend.nrcan.gc.ca or mend2000.NRCan.gc.ca
or send an e-mail to: mend_monitor@nrcan.gc.ca



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Global Alliance

- International model of interaction among the various initiatives involved in acidic drainage.
- Launched at 6th ICARD – July 2003



Global Alliance

- Partnership for Acidic Drainage Remediation in Europe (PADRE) joined as the European partner at Mine Water 2004



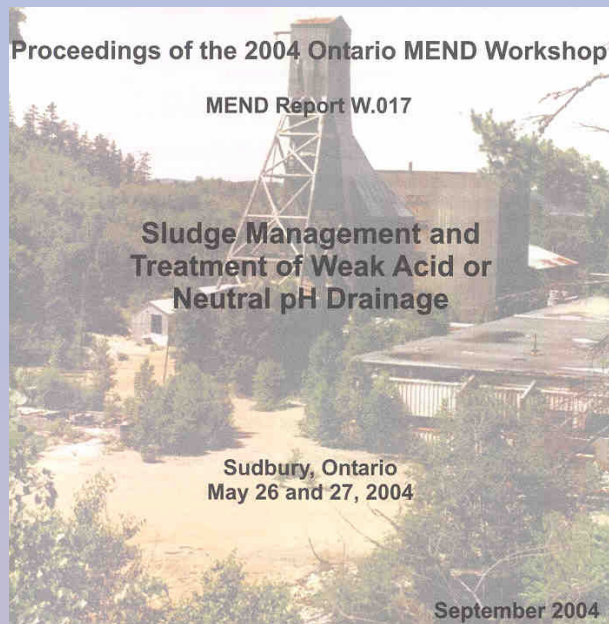
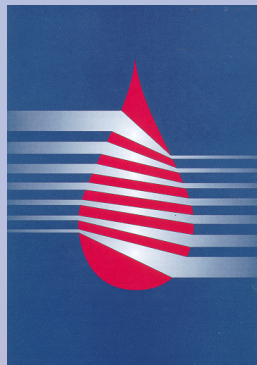
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ONTARIO MEND WORKSHOP

- Sludge Management and Treatment of Weak Acid or Neutral pH Drainage
- May 26 and 27, 2004 / Sudbury, ON
- Proceedings available on CD-ROM



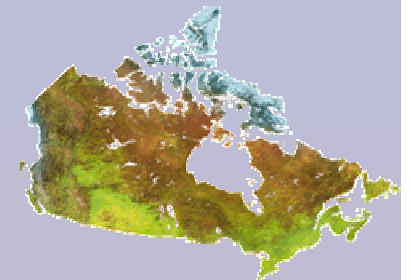
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MEND Future Activities

- Workshops
 - 12th BC/MEND Workshop, Vancouver
- Conferences
 - Symposium 2005 on Mines and the Environment, Rouyn-Noranda, May 15 to 18, 2005
 - 7th International Conference on Acid Rock Drainage, St-Louis, Missouri, March 26 to 30, 2006



Program Plans for 2005/2006

- Budget of \$270 K for 2005
 - \$125K from MAC for research
 - \$ 45K for Prediction Manual (BC, INAP, ON, MERG)
 - \$100K for Secretariat (MAC \$50K; CANMET \$50K in kind)
- Emphasis on priority issues and recommendations from existing studies:
 - Cold temperature studies
 - Workshop(s) for 2005 (12th BC/MEND)
- Results of MEND Steering Committee meeting held November 30.



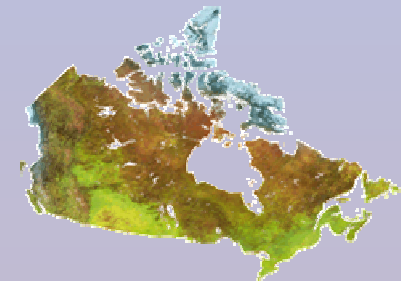
Key Message

MEND is a Canadian partnership with industry, the federal and provincial governments and non-governmental organizations to cooperate in technology development and to transfer knowledge to improve environmental management



MEND Steering Committee

- Kim Bellefontaine – British Columbia
- Gilles Tremblay (Secretariat) - NRCan
- Christine Kaszycki - Manitoba
- Louis Bienvenu - Québec
- (W.R) Dick Cowan - Ontario
- Ross Gallinger – Placer Dome (INAP)
- Bill Price – NRCan
- John Martschuk - Barrick
- Elizabeth Gardiner – Mining Association of Canada
- Mike Aziz – Placer Dome
- Patrick Finlay - EC
- Catherine Coumans - MiningWatch Canada
- Denis Kemp – Noranda Falconbridge
- Amy Crook – Center for Science in Public Participation
- Charlene Hogan (Secretariat) - NRCan



Mine Environment Neutral Drainage
(MEND)
mend.nrcan.gc.ca



International Network on Acid
Prevention
www.inap.com.au



National Orphaned and Abandoned
Mines Initiative (NOAMI)
www.abandoned-mines.org



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Seasons Greetings

from the MEND Secretariat

THE EDEN PROJECT



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